

eloquence and scientific ability. He did not confine himself to any one subject, but glanced at the progressive character of science, the need for the work of all varieties of minds, and the aim and purpose of science as applied in the medical arts. On the same afternoon Prof. Virchow discussed the value of pathological experiment in an address displaying the most thorough grasp of his subject and vigour of thought and diction; he attacked the opponents of vivisection for their utter inconsistency, and gave a very weighty protest against their claim to regulate the pursuit of knowledge. The French address was to have been read by Prof. Raynaud of Paris, but his sudden death only a few days before the meeting prevented this arrangement being carried out, and the address he had already prepared was read by his friend, M. Féréol: it dealt with the subject of the right sphere of action, and the influence of scepticism in medicine. On Saturday Dr. Billings gave a masterly address on Medical Literature; his tables showed a most alarming growth in the production of volumes and periodicals during the past ten years, but he was able to give some consolation by the statement that the rate of growth had of late shown some slackening: his wise and witty remarks on book-writing, bibliography, cataloguing, and reference were especially valuable as coming from a man of considerable experience in these matters, and applying equally to all varieties of literature. On Monday, Prof. Volkmann, one of Mr. Lister's most ardent disciples in Germany, gave an address on Modern Surgery, which resolved itself into a review of the progress and results of antiseptic surgery. He was followed by Prof. Pasteur, who in a few moments described his latest experiments, and announced results which promise to have as important effects for useful animals as Jenner's vaccination has for man. The final general meeting was held on Tuesday last, when Prof. Huxley addressed the Congress on the Connection of the Biological Sciences with Medicine, tracing this connection from step to step, and pointing out the necessity for a similar close union in the future. The entertainments during the week have been many and brilliant, including, in addition to many partly private, a soirée at South Kensington Museum, a dinner at the Mansion House, reception at the Guildhall, reception by Earl and Lady Granville, *conversazione* at the College of Surgeons, and informal dinner at the Crystal Palace. Notwithstanding all these diversions the real hard work that has been done every day by the great mass of the members of the Congress has been very great, and this, and the free interchange of ideas in conversation of many workers in the same part of the field of science, must be productive of good, both by its direct effect and by the stimulus to work it must afford. Among the many subjects discussed, the germ theory and its various practical bearings and outcomes, have had a prominent share. In the Surgical section there was a debate on the treatment of wounds, in which it was incidentally raised, and there appeared to be a general consensus of opinion that particulate germs play an all-important part in the production of wound diseases, though there was by no means such agreement as to the best means of treating wounds. In the Pathological section a long and very animated discussion was introduced by Prof. Klebs, who discussed the relations of minute organisms to certain specific diseases. Dr. Charlton Bastian supported his well-known views, and was opposed by Lister, Virchow, Pasteur, Hueter, Cheyne, and Roberts, and it was made abundantly evident that the germ theory of disease has not only established itself firmly in the faith of scientific pathologists, but that its importance is becoming wider and greater with rapid strides. By far the most valuable of all the communications bearing upon this subject was M. Pasteur's account of his recent "vaccination" experiments. He has found that by a special mode of cultivation of the poison of chicken cholera he can obtain

an attenuated or weakened virus, and that vaccination with this attenuated virus, which merely causes slight and transient local mischief, protects fowls completely from the most active virus for a certain time, and enables them to resist the disease for a far longer period. He has also demonstrated that the source of the attenuation of the virus is the action of atmospheric oxygen, for it is only when the "germs" are allowed to develop in the presence of abundance of oxygen that the containing fluid becomes less intensely poisonous. A "vaccine" for splenic fever or charbon could not be obtained in this manner, but if the virus be allowed to develop in a solution at a temperature of 42°—43° C., with free exposure to the air, it quickly becomes less active, and ultimately, at the end of a few weeks, dies. Experiments on sheep have shown that vaccination with this "attenuated lymph" protects the animal from the action of the purer and more active poison. But great as will be the value of these researches, even if only applied to the two diseases in question, it is far more important to notice their extreme importance from a scientific point of view. First of all they explain in part the action of oxygen in preventing septic infection, and the inflammatory complications of wounds. But they also excite the hope, and go far towards showing that it is not improbable, that by some special form of cultivation every disease-virus may be thus attenuated and a poison result, which if inoculated will produce only a transient local change, but will protect from the virulent form of the disease as completely as efficient vaccination protects from small-pox. Prof. Pasteur referred to the germ theory of disease as one which has ceased to number the practical triumphs it has won; and every day is giving results to add to its importance and value.

#### NOTES

MR. W. H. M. CHRISTIE, F.R.S., First Assistant at Greenwich Observatory, has been appointed Astronomer Royal, in succession to Sir George Airy, who retires after holding the office for nearly half-a-century.

ON October 17 next, fifty years will have elapsed since Prof. Bunsen, the eminent chemist, received his doctor's diploma from Göttingen University. He, however, intends to absent himself from Heidelberg on the day in question, in order to avoid all congratulations and speech-making.

MR. W. A. FORBES, B.A., Fellow of St. John's College, Cambridge, Prosecutor to the Zoological Society, has been appointed Lecturer on Comparative Anatomy at Charing Cross Hospital, *vice* the Rev. J. F. Blake, removed to Nottingham.

THE discussion in connection with Mr. Mundella's able statement on the Education Estimates had no special bearing on the teaching of science in elementary schools. Steps are evidently being taken to make elementary education more and more efficient, to give those whose school years are short and precious every opportunity of acquiring a knowledge of things that will be really useful to them in after life. It is clear from the facts and figures, as well as the tone of Mr. Mundella's address, that the education of the country is safe in his hands. In the proposals for the revision of the Code laid on the table of the House are several changes for the better. In infant schools, for example, part of the course provided for is a systematic one of simple lessons on objects and on the phenomena of nature and common life. Among the "Class Subjects" in boys' and girls' schools are Physical Geography and Elementary Science, and among the specific subjects are Mechanics, Animal Physiology, Botany, Principles of Agriculture, and Domestic Economy. This is all in the right direction, and is just what we should expect from an Education Minister like Mr. Mundella.

MR. MUNDELLA stated on Monday that Prof. Leone Levi has prepared an elaborate report on technical education in Italy,

which will be referred to the Royal Commission about to be appointed.

AT the Exhibition of Electricity the completion of the English telegraphic department is progressing favourably. The series of solid and compact sounders used in the British service will contrast, not without advantage, with the quadruplex Baudat and other apparatus presented by the French administration. The Italian historical section is full of relics of instruments used by Galvani, Volta, &c. A large number of autographs will be exhibited, among which we may note a letter from Volta to Sir Joseph Banks, then president of the Royal Society. This document is stated to be the first description of the Voltaic battery ever written by its inventor. A small magnet, which Galileo armed with his own hand, is exhibited, as well as another magnet used by the academicians "del Cimento" for their determination of the laws of the variation of the attractive power according to distance. The Academy of Aërostation of Paris exhibits a model of the electro-subtractor, an electrical balloon constructed according to the principles advocated by Dupuy de Lome, and a number of other electrical instruments. M. Jules Godard, a well-known aéronaut, has sent an electrical warmer; when the balloon is descending an electrical vibrator is set in operation; when it is ascending another bell rings. This effect is obtained very simply by a valve, which is in equilibrium when the balloon keeps its level, and is moved by a slight wind. The formal opening was to take place yesterday by a visit of the President of the Republic, and the doors will be thrown open to the public to-day, although much remains to be done for the completion of the display, which will be a great success.

THE French Government has appointed a Committee, presided over by Rear-Admiral Bourgeois, to study the different applications of electricity to navigation.

THE rapid advance of civilisation, it is admitted, has the effect of causing native races more and more to disappear. It is therefore the duty of scientific ethnology to save the little which exists still in its originality from destruction, and to preserve the few authentic fragments of an epoch which threatens to be annihilated. The Anthropological Society of Hamburg has issued an application to all those who have occasion, either by their position or calling, &c., especially to consuls, missionaries, merchants, captains, to enter their notes on little-known countries and their populations on a schedule which the Society will supply. The questions being intentionally short and as few as possible, any further communications on the character of the country, notes on the climate, corrections of the charts and sailing directions, would be thankfully welcomed. A great service would be rendered also by sending ethnographical objects, photographs, models, &c., which will be entrusted to the care of the Ethnological Museum.

FROM a Report on the means employed in France for protecting the vine from destruction by the Phylloxera, by Mr. C. H. Perceval, H.M. Consul at Bordeaux, we take the following interesting extract:—"The information which I have gathered on this subject, from official and other sources, tends to reduce the methods used to the following three:—firstly, submersion of the vineyard, when practicable; secondly, by employing insecticides; and, thirdly, where the vineyards have been destroyed, by the plantation of American varieties of vines, whose roots offer more resistance to the attack of the insect. M. Armand Lalande, the President of the Chamber of Commerce of Bordeaux, proprietor of extensive vineyards in the Médoc, a gentleman to whom I am much indebted for the information and assistance which he has been kind enough to afford me in drawing up this Report, addressed a meeting of that body held in March

last on various topics, and I translate the following from his remarks regarding the Phylloxera:—"The Chamber of Commerce has not ceased to show the extreme importance which it attaches to all the means employable in combating this dreadful scourge. Of the 2,200,000 hectares which composed the vineyards of France, 500,000 are destroyed, 500,000 others are greatly attacked: it is a loss of more than three milliards to the country. The Gironde is one of the departments which has suffered most: one-third of the vineyards are destroyed, another third is badly attacked. We must admit, with sorrow, that the very sources of our commerce and of the well-being of our southern population are most seriously compromised. Still we have great hopes that, by energetic and intelligent efforts, we may be enabled gradually to arrest and repair the evil. For the very important vineyards of the Gironde, where submersion is possible, it is a sure remedy, which is generally employed, and with invariable success. In the cases of vineyards already destroyed, the remedy seems to be, to reconstitute them by planting American vines as stocks for grafting French cuttings on, which plan has been the subject of satisfactory and conclusive experiments for the last few years, especially in Languedoc. Where the vines are not too far gone, a judicious use of sulphur or carbon is a certain means of preservation, and, in most cases, practicable, owing to the moderation of the cost." He then states that he bases his opinion on astonishing and conclusive results, which he has observed in immense vineyards in Languedoc, and also in others of the Gironde, and proposes that steps may be taken to hold an international congress on Phylloxera here in the autumn." The Congress is to open on September 5. As we intimated last week, another Viticultural Congress meets in Milan next week. Mr. Perceval gives some valuable details on the various methods of treating the disease.

MM. KOCH AND KLOCKE, who have continued during the summer of 1880 their interesting observations on the motion of the Morteratsch glacier, publish their results in the eighth volume of the *Proceedings* of the Natural History Society of Freiburg. They have measured each half-hour during a fortnight the motion of a point on the glacier, and this year, as well as during the foregoing year, their results are almost negative, *i.e.* the motion was so slow, and the advance of their signal-stick was so small and often even negative, that nothing can be inferred until now as to the motion of this glacier. Thus observing, for instance, the advance of their signal each half hour, on September 11, from midday to six o'clock in the evening, they find the following figures, in millimetres: 0.5, -0.5, -0.5, 0.5, 0.0, 0.2, -0.2, 0.2, -1.0, 1.3, -1.5, -1.5, the negative figures showing a back movement of the signal. Therefore MM. Koch and Klocke have undertaken a thorough verification of their instruments, and they have arrived at the conclusion that the motion observed cannot be attributed to errors of observation. Besides they have devised a special arrangement for keeping their signal motionless in the ice; they sink into the ice of the glacier a large copper tube which is filled with ice and salt, and covered by a small hill of ice, and only then they adjust their scale on the tube. This signal remaining firm throughout the day in the ice, the theodolite being also motionless, and the probable errors of observation not exceeding 0.3 millimetres, the small observed motions must be attributed, they suppose, to some cause yet unknown.

AT a recent preliminary meeting at Fishmongers' Hall it was resolved to hold a public meeting in the above hall on Friday, August 5, to make arrangements for holding an International Fisheries Exhibition in 1883.

UNDER the superintendence of Mr. Wallace, rector of Inverness High School, several of the scientific societies of Northern Scotland met at Elgin on July 29 and 30. Several papers were



read and excursions made to places of interest in the neighbourhood, and the meeting seems to have been altogether satisfactory. Arrangements were made to hold a similar meeting next year at Inverness.

THE Annual Meeting of the British Medical Association was opened on Tuesday at Ryde, Isle of Wight.

ANOTHER smart earthquake shock, not so strong however as the last, was felt at Geneva on Friday morning. Three earthquake shocks were felt on Thursday night at Allevard, near Grenoble. An undulatory shock of earthquake was felt at Agram on July 28 at 11h. 8m. a.m. Its direction was from south-east to north-west, and subterranean noise accompanied it. Earthquakes are also reported from Haiti on July 5 and 7, from St. Vincent June 24 and 25, and from Trinidad on June 29.

THE Annual Report of the Paris Observatory for the year 1880 has just been published by the director, Admiral Mouchez. The chief work of the Observatory was the continuation of the revision of the Catalogue of Stars of Lalande; and of the 30,000 observations which were made by the meridian instruments 28,331 were made for this purpose. Until this is finished, the Observatory cannot undertake any other great work; and a catalogue of 20,000 stars observed two or three times up to the end of 1879 is already prepared. As to the precise determination of positions of the fundamental stars, it is not yet begun, the astronomers being engaged in the study of the errors of instruments. M. Lœwy has continued the study of the flexion of the meridional instruments, and the error for the larger one was found to be about 0.02 mm., that is about one second of arc. But M. Mouchez expresses the fear that this small error will be less than several accidental errors depending upon changes of temperature, upon the movements of the telescope and upon the errors of refraction due to imperfect observations of temperature at various heights. The great equatorial telescope was but little used, mainly because of the difficulties of management of the revolving tower. With the other equatorial telescopes the astronomers of the Observatory continued their work on the ecliptical charts, as well as of Jupiter, of the comets, of several small planets, and of double stars. The great telescope was employed for the first time during last year for photography; the photographs of the moon, not, however, as fine as those of Rutherford—will probably be soon much improved; several photographs of double stars, and even of nebulae, were obtained. The most interesting work in physical astronomy was done by M. Thollon with the spectroscope: one of the protuberances he studied was rather remarkable by its immense length of eight minutes, that is of 300,000 kilometres. Much attention was given to the transmission of time to the clocks of the Observatory itself, of Paris, and of provincial towns. The astronomical museum, which will be opened at the Observatory, will soon be quite finished; it will contain a variety of instruments formerly used by renowned astronomers, numerous photographs of instruments of different observatories, and portraits; as to these last, the Report speaks in high terms of the courtesy of several astronomers in England, who have given all facilities for the execution of portraits from originals in their possession. After mentioning the various works pursued by the astronomers of the Observatory, besides their regular business, the Report speaks of the preparations for the observation of the transit of Venus in 1882. None of the methods employed until now have given quite satisfactory results, and the simple observation by telescope may yield errors of as much as ten and fifteen seconds. The photographs, which it was necessary to enlarge thirty and forty times, do not afford the necessary cleanliness. Thus the Observatory proposes to employ micrometrical measures which will afford a greater degree of accuracy when done by telescopes than those which are taken on photographs.

THE opening of the Période "Electorale" has directed the attention of the French Government to the opportunity of connecting the municipal telegraphic system of Paris with the postal organisation. It will be the work of a few days, and of a few hundred pounds.

FROM a privately issued report on silk cultivation in the Chinese province of Kwangtung, we learn that in the Pakhoi district, on the southern seaboard, wild silkworms are found which feed on the camphor tree, and their silk is utilised in a singular manner. When the caterpillar has attained its full size, and is about to enter the pupa state, it is cut open and the silk extracted in a form much resembling catgut. This substance, having undergone a process of hardening, makes excellent fish line, and is generally used for that purpose in the Pakhoi district.

FROM the Colonies and India we learn that a thick vein of a peculiar substance, which, according to local chemists, contains 50 per cent. of pure paraffin, has been discovered at Hawkes Bay, New Zealand. It is said to be worth 40% per ton, and to exist in enormous quantities.

THE latest excavations made by order of the Athens Archaeological Society at Tanagra, the well-known place in Boeotia whence come the charming terra-cotta figures, have yielded important results. On the northern side of the town, in front of the principal gate, fifteen tombs were discovered which were completely untouched. They contained some sixty clay figures, most of them perfect, and measuring between 10 and 35 centimetres in height. They represent satyrs and women standing and sitting, and one is a group of two figures. Besides these many vessels were found, amongst which some twenty lekythoi (paint and oil phials) with antique-painted ornaments. Unfortunately most of these were broken. One vase which was found in a stone case shows an artistic inscription which designates it as a work of Teisias. We may also mention that fourteen scraping irons were found, and also that in two of the tombs some fifty small terra-cotta ornaments were discovered, most of which were brightly coloured, and some covered with thin gold. The excavations became even more important after April 1. The published report mentions twenty vessels, some broken, ten of which are ornamented with paintings. Two of these are said to be particularly fine. Of the numerous clay figures only eight could be got out in a tolerably perfect condition. Of these two are reported to be the most perfect figures ever found at Tanagra. One represents a winged youth who is about to raise himself into the air; before him is a maiden on her knees, her dress forming an arc above her; the youth holds her by the arms as if he wished to take her along with him in his flight. The other masterpiece is an Aphrodite rising from the sea, diving up out of a shell as it were.

THE additions to the Zoological Society's Gardens during the past week include a Polecat (*Mustela putorius*), British, presented by Mr. H. C. Brooke; two Ground Squirrels (*Xerus getulus*) from West Africa, presented by Dr. W. Hume Hart; a Bateleur Eagle (*Helotarsus ecaudatus*) from Africa, presented by Mr. William Waters; a Black-footed Penguin (*Spheniscus demersus*) from South Africa, presented by Capt. Robinson, R.M.S. *Warwick Castle*; two Black Storks (*Ciconia nigra*), European, presented by Dr. Rudolph Blasius; two Wood Owls (*Syrnium aluco*), European, presented by Mr. H. T. Archer; a Slow worm (*Anguis fragilis* albino), British, presented by Mr. A. Phipson, F.Z.S.; two Green Lizards (*Lacerta viridis*) from the Island of Jersey, presented by Mr. Claud Russell; a Sykes Monkey (*Cercopithecus albicularis*) from East Africa, a Common Chamæleon (*Chamæleon vulgaris*) from North Africa, deposited; an Erxleben's Monkey (*Cercopithecus erxlebeni*) from West Africa, two Egyptian Mastigures (*Uromastix spinipes*) from North Africa, two Aldrovandi's Skinks (*Plestiodon auratus*) from

North-West Africa, two Pantherine Toads (*Bufo pantherinus*) from Tunis, on approval; a Bennett's Wallaby (*Halmaturus bennetti*), born in the Gardens. In the Insectarium may now be seen larvæ of the scarce Swallow-tail Butterfly (*Papilio podalirius*), also those of *Attacus atlas* of various sizes, from ones just hatched to ones nearly full-fed. Other noticeable larvæ are the curiously shaped ones of *Stauropus fagi*, and young ones of the North American *Samia cecropia*. Imagos of *Attacus pernyi* are also emerging, reared from eggs laid in the Insectarium in the earlier part of the summer.

### OUR ASTRONOMICAL COLUMN

GOULD'S COMET-OBSERVATIONS ON JUNE 11.—Dr. B. A. Gould, director of the Observatory at Cordoba, has communicated to the *Astronomische Nachrichten* particulars of his experiences while observing the great comet of the present year on the evening of June 11. On that evening, he says, "the comet was found with but little difficulty, although considerably north of the estimated place, being recognisable by its diffuse aspect, elongated form, and large diameter, although it was quite pale in the bright twilight, and the tail could not be seen." He had just obtained a rough determination of its position from the equatorial circles for the purpose of finding and identifying some comparison-star, when he found one in the field. He considered it to be some one of the many bright stars of Orion in the vicinity, which would be readily identified, and hence did not complete the approximate determination with the usual care, nor obtain instrumental readings for the star. This he describes as "only a little fainter than the comet itself, and not very dissimilar in aspect: since, although its apparent diameter was much less than the comet's, it was greatly blurred by the exceptionally thick haze and the mists of the horizon, the zenith distance being nearly 80°, I do not think it would have been below the third magnitude, and could rather believe it to have been as bright as the second." Dr. Gould adds: "Only four comparisons were obtained before the comet passed below the horizon; then on attempting to identify the star, I found it in none of the catalogues."

On the next evening he examined the region without finding any visible star, but Rigel was much brighter than the missing object, and there was no visible object in the vicinity of the comet, which he found nearly three degrees to the northward.

The observations gave the following results:—

1881, June 11, position of the comet from the circles of the equatorial, 10h. 58m. 9s. sidereal time. Right ascension, 5h. 11m. 4s. Decl.  $-9^{\circ} 36'$ .

The comparisons with the star gave:—(Comet—star.)

Cordoba Sid. T.	Diff. R.A.	Diff. Decl.	
h. m. s.	m. s.	R.	
II 8 49 ...	+ 0 49 ...	- 16'40	One revolution
II 11 2'5 ...	49 ...	16'16	of micrometer
II 13 11'0 ...	48 ...	16'17	= 19''08.
II 14 37'5 ...	48'5 ...	15'87	

II 11 55 ... + 0 48'6 ... - 16'15 (- 5' 8''1).

Thus he deduced for the star's position R.A. 5h. 10m. 16s. Decl.  $-9^{\circ} 30'$ , where our catalogues have no conspicuous star. In his letter to Prof. Krueger he concludes thus:—

"The whole observation has seemed to me so improbable that I have hesitated a good deal before sending it to you, fearing some gross error in reading the circles. But I have discovered none, and the later determination of the comet's geocentric path will remove all uncertainties of this kind."

On receiving these particulars Prof. Krueger, determined the place of the comet for the time of Dr. Gould's observation, from the elements we published in this column, which were founded upon observations between June 22 and July 1, and finds R.A. 5h. 11m. 15s., Decl.  $-9^{\circ} 32'0$ , and thence for the place of the star R.A. 5h. 10m. 26s., Decl.  $-9^{\circ} 26'9$ , showing only such differences from the observed place as might be well attributed to uncertainty of observation so near the horizon, and to the corrections which the elements used probably required before the perihelion passage. Prof. Krueger remarks that no known bright star exists in this position, and the star-chart of the Berlin Academy for this region, which was formed by Dr. Schmidt, shows here a great blank. He draws attention also to the significant fact that the observed motion in declination in the interval between the first and last comparisons is much less than that

which the comet must have had; the elements would indicate about  $45''$  or more than  $2\cdot3$  revolutions of the micrometer-screw, while the observations give only  $0\cdot5$ . Dr. Gould especially remarks upon the resemblance of the object to the comet, and Prof. Krueger suggests whether there could have been "eine Verdoppelung des Cometen in Folge einer Luftspiegelung," or again was a second comet observed?

The case is a very interesting one. With elements which must give the comet's place on June 11 within a very few seconds of arc, Prof. Krueger's inferences are fully borne out. Thus for June 11<sup>h</sup> 1962, Greenwich mean time, which corresponds to 11h. 11m. 55s. Cordoba sidereal time, diminished by the time for aberration, the right ascension of the comet is found to have been 5h. 11m. 13'0s., Decl.  $-9^{\circ} 35' 18''$ , agreeing closely with Dr. Gould's instrumental place obtained a few minutes earlier, and the differential observations thus give for the apparent position of the star, R.A. 5h. 10m. 24'4s., Decl.  $-9^{\circ} 30' 10''$ . There appears to be a misprint or an oversight in Dr. Gould's letter as regards the zenith distance of the comet and neighbouring object at the time of his observations, which would be nearer  $85^{\circ}$  than  $80^{\circ}$ .

SCHÄBERLE'S COMET.—The following elements of this comet have been calculated by M. Bigourdan, of the Observatory at Paris, from observations on July 18, 23, and 28:—

Perihelion passage, 1881, August 22<sup>h</sup> 60m 20s, M.T. at Paris.

Longitude of perihelion ...	334 41 10	} M.Eq. 1881'0
" ascending node ...	96 48 23	
Inclination ...	39 56 38	
Log. perihelion distance ...	9'801788	
Motion—retrograde.		

Whence the comet's positions for midnight at Berlin, or about 11h. 6m. G.M.T., will be:—

	R.A.			Decl.	Log. Distance from	
	h.	m.	s.		Earth.	Sun.
August 11 ...	7	54	0	+ 52 7'6	9'9307	9'8307
13 ...	8	22	55	52 45'6	9'8973	9'8218
15 ...	8	57	39	52 47'2	9'8638	9'8142
17 ...	9	37	38	51 51'4	9'8317	9'8083
19 ...	10	20	39	49 36'7	9'8031	9'8043
21 ...	11	3	21	+ 45 49'6	9'7806	9'8020

The comet was within naked eye vision on the morning of July 29, and the intensity of light, according to theory, should increase until August 25, about which time we may look for a pretty conspicuous object. The most favourable period for observation will be during the last ten days of August.

### THE CONNECTION OF THE BIOLOGICAL SCIENCES WITH MEDICINE<sup>1</sup>

THE great body of theoretical and practical knowledge which has been accumulated by the labours of some eighty generations, since the dawn of scientific thought in Europe, has no collective English name to which an objection may not be raised; and I use the term "medicine" as that which is least likely to be misunderstood; though, as every one knows, the name is commonly applied, in a narrower sense, to one of the chief divisions of the totality of medical science.

Taken in this broad sense, "medicine" not merely denotes a kind of knowledge; but it comprehends the various applications of that knowledge to the alleviation of the sufferings, the repair of the injuries, and the conservation of the health, of living beings. In fact, the practical aspect of medicine so far dominates over every other, that the "Healing Art" is one of its most widely received synonyms. It is so difficult to think of medicine otherwise than as something which is necessarily connected with curative treatment, that we are apt to forget that there must be, and is, such a thing as a pure science of medicine—a "pathology" which has no more necessary subservience to practical ends than has zoology or botany.

The logical connection between this purely scientific doctrine of disease, or pathology, and ordinary biology, is easily traced. Living matter is characterised by its innate tendency to exhibit a definite series of the morphological and physiological phenomena which constitute organisation and life. Given a certain range of conditions, and these phenomena remain the same, within narrow limits, for each kind of living thing. They

<sup>1</sup> Address at the International Medical Congress. By Prof. T. H. Huxley, LL.D., Secretary to the Royal Society.